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Eophoxocephalopsis colombus, a new species (Crustacea: Amphipoda: Phoxocephalopsidae) from the southwest Atlantic

Gloria M. Alonso de Pina

Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", División Invertebrados, Avda. Angel Gallardo 470, (1405) Buenos Aires, Argentina

Abstract.—A new species, *Eophoxocephalopsis colombus*, is described and illustrated from the Chubut province: Golfo Nuevo, and the south of Buenos Aires province. The assignment of the new species to *Eophoxocephalopsis* is discussed. It is separated from the other species of the genus by the shape and number of setae on the inner plate of maxilla 1, and the shape of epimera 2 and 3. The specimens were dredged from sandy substrata at different depths.

The new species described here was found on the southwest Atlantic coast of Chubut province: Golfo Nuevo, Colombo beach, at approximately 42°37′S, 64°16′W, and in the Argentine continental shelf of El Rincón area, in the Buenos Aires province, approximately 39° to 40°S and 61° to 62°W. Specimens were obtained with a small dredge in the first locality mentioned above and with a Van Veen dredge during a survey carried out by the R/V *El Austral* in the second locality. All samples were collected in sandy substrates at different depths in the intertidal and subtidal zones.

The type specimens are deposited in the Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires, Argentina (MACN).

Eophoxocephalopsis Thurston, 1989
Eophoxocephalopsis colombus, new species
Figs. 1–49

Holotype.—Ovigerous female 3.8 mm (MACN N° 34377), Chubut province: Golfo Nuevo, Colombo beach (approximately 42°37′S, 61°16′W); depth 2 m; 2 Nov 1995.

Paratypes.—9 females 2.5–3.6 mm (MACN N° 34378), 11 males 2.25–3.0 mm (MACN N° 34379), Chubut province: Golfo Nuevo, Colombo beach (approximately 42°37′S, 61°16′W); depth 2 m; 2 Nov 1995. 4 females 2.75–3.85 mm (MACN N° 34380), Chubut province: Golfo Nuevo, Colombo beach (approximately 42°37′S, 61°16′W); depth 0.4 m; 3 Nov 1995. 1 male 2.8 mm (MACN N° 34381), 39°10′04″S, 61°10′03″W (sta 5); depth 17 m; 3 Nov 1993; 3 females 3.2–3.45 mm (MACN N° 34382), 1 male 2.3 mm (MACN N° 34383), 39°15′10″S, 61°34′41″W (sta 11); depth 14 m; 3 Nov 1993; 2 females 3.2 and 3.3 mm (MACN N° 34384), 1 male 2.05 mm (MACN N° 34385), 39°15′02″S, 61°25′03″W (sta 12); depth 17 m; 3 Nov 1993; 1 ovigerous female 3.5 mm (MACN N° 34386), 1 male 3.25 mm (MACN N° 34387), 39°14′49″S, 61°14′50″W (sta 13); depth 17 m; 3 Nov 1993; 2 males 3.1 and 3.2 mm (MACN N° 34388), 39°24′59″S, 61°50′02″W (sta 18); depth 11.5 m; 1 Nov 1993; 6 males 2.8–3.4 mm (MACN N° 34389), 4 juveniles 1.6–2.8 mm (MACN N° 34390), 40°09′52″S, 61°51′55″W (sta 32); depth 15 m; 2 Nov 1993; 2 females 3.8 and 3.9 mm (MACN N° 34391), 1 male 3.45 mm (MACN N° 34392), 40°19′46″S, 61°51′55″W (sta 34); depth 15 m; 2 Nov 1993; Buenos Aires province: El Rincón.

The samples from Colombo beach were collected by Meijide and Ianovski and donated by D. Roccatagliata. The samples from El Rincón were collected, sorted and donated by D. Roccatagliata and M. Torres Jordá.

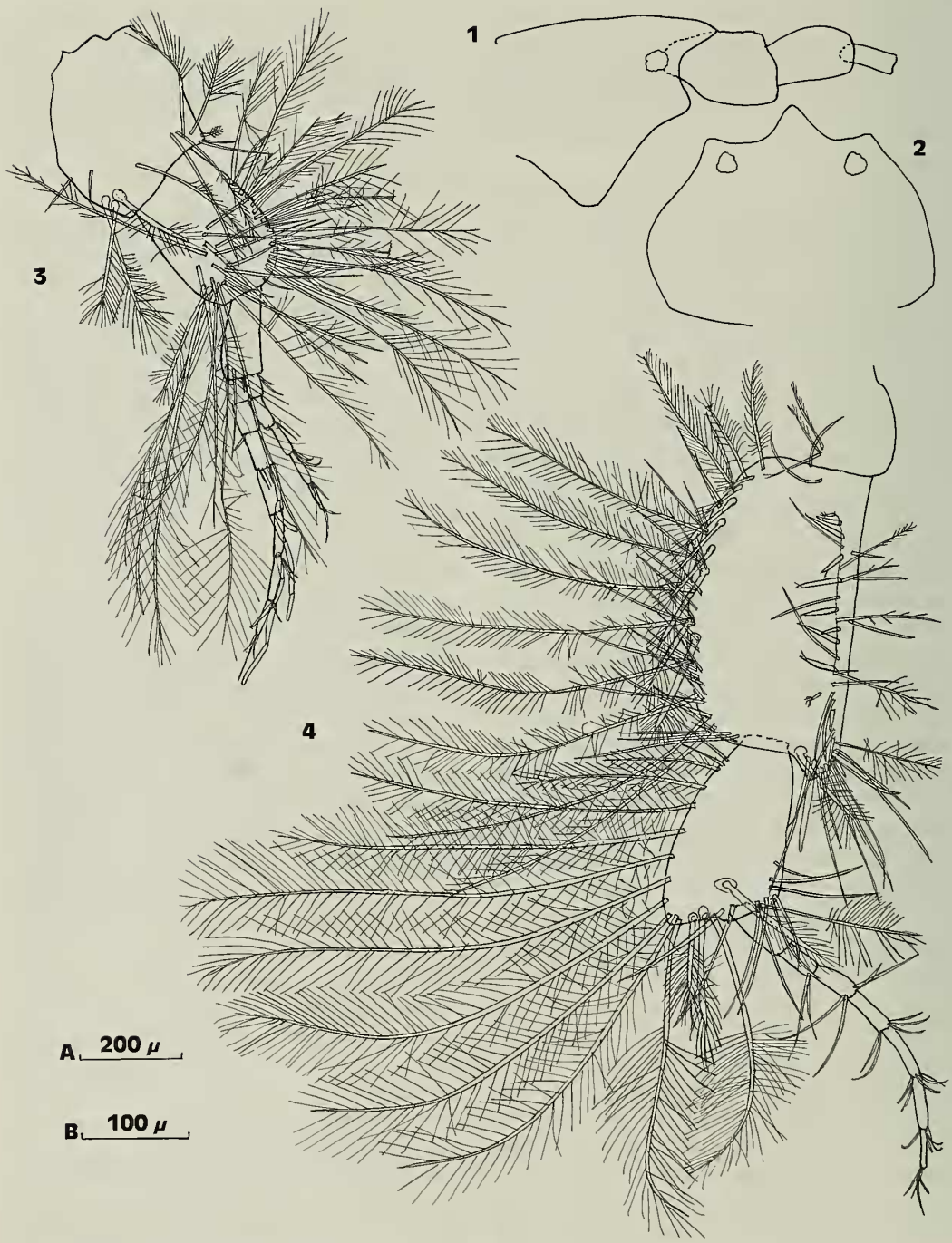
Description.—Holotype, ovigerous female, body length 3.8 mm. Head about 79% as long as wide, rostrum about 17% of total body length; cheek somewhat extended ventrally, broadly rounded; eyes without pigment specimens preserved in ethanol (Figs. 1, 2).

Antenna 1 (Fig. 3), peduncle, article 1 short, dorsolateral armament of 5 plumose and 3 penicillate setae in curved row; article 2 about as long as article 1, with long plumose setae and spines dorsally; article 3 about half as long as article 2; primary flagellum of 7 articles, formula of long aesthetascs 0-0-1-1-1-1; accessory flagellum with 4 articles. Antenna 2 (Fig. 4), peduncle, article 3 with 4 short plumose setae laterally; article 4 facial armature consisting in row of thin spines and simple setae, towards produced apex becoming mixed with plumose setae, ventral margin with numerous stiff penicillate setae, common spines and long plumose setae; article 5 expanded apically, shorter and narrower than article 4, with 3 apicofacial penicillate setae, apical and subapical thin spines, with ventral row of long plumose setae; flagellum geniculate, longer than peduncle article 4, with 7 articles.

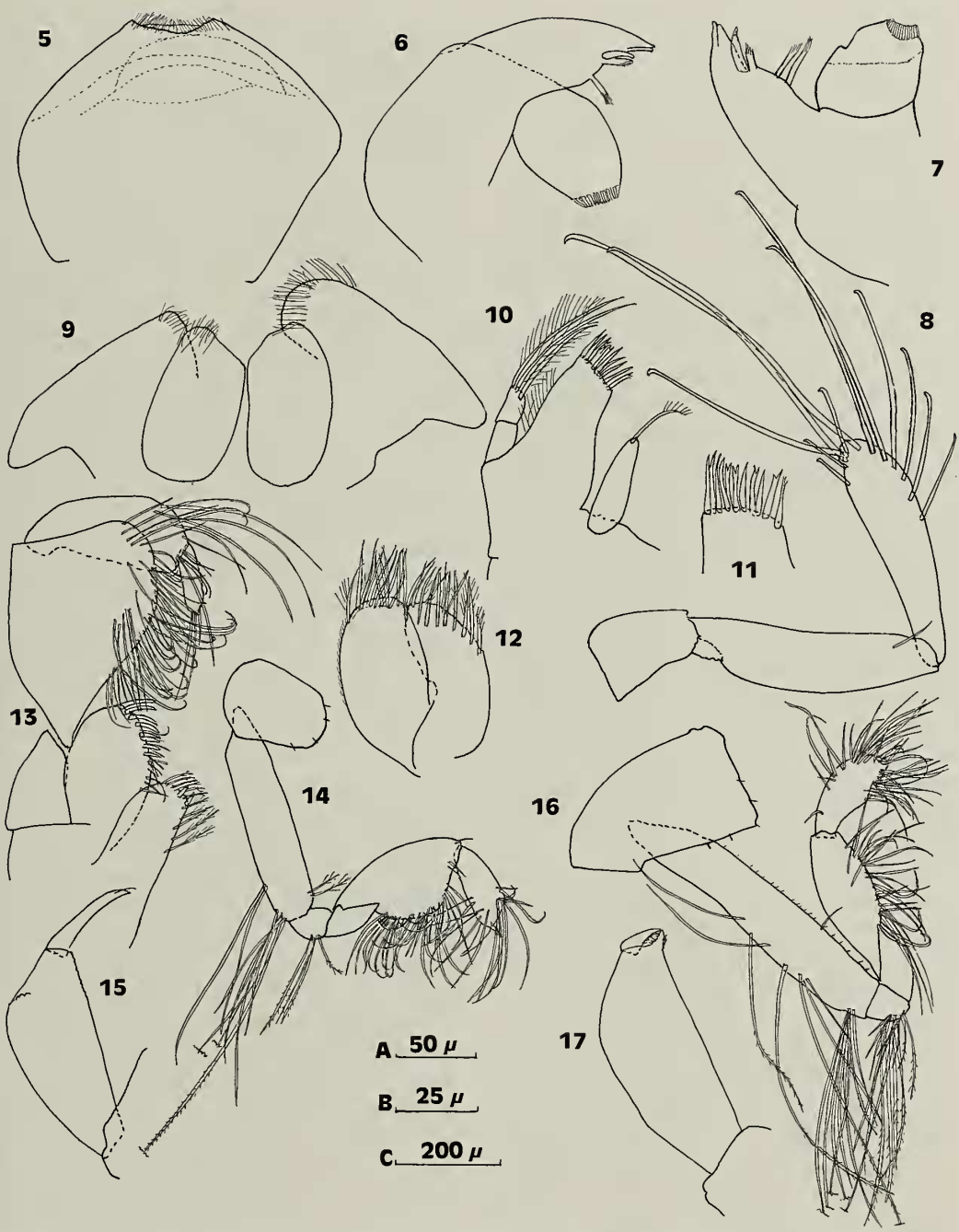
Epistome not produced. Upper lip broadly rounded, apically excavate (Fig. 5). Mandible, incisor greatly extended, rather slender, weakly toothed; right lacinia mobilis simple, left acute with 3 accessory teeth poorly developed; rakers stout, serrate, 2 on right mandible, 3 on left; molar stout, toothed, weakly triturative (Figs. 6, 7); palp, article 3 with 9 spine-setae apically and 3 on distal half (Fig. 8). Lower lip, inner lobes large; mandibular process well developed, rounded (Fig. 9). Maxilla 1, inner plate long, thin, bearing 1 apical plumose seta; outer plate with 11 spines, some of these dentate; palp short, biarticulate, article 2 about as long as article 1, with 2 apical setae and 1 apicomedial seta, all plumose (Figs. 10, 11). Maxilla 2 (Fig. 12), plates oval, inner plate shorter and narrower than outer, with oblique facial row of plumose setae, simple and plumose setae apically and apicomedially; outer plate with mixed setae on apical and apicolateral margins, and stiff setae on apicoventral margin. Maxilliped (Fig. 13), inner plate with 2 thick apical spines, 6 plumose setae apically and 5 medially; outer plate larger than inner plate, with thick medial spines; palp, article 2 expanded, with high number of marginal and facial spines, article 3 clavate, with facial and distolateral setae, dactylus digitate, blunt, less than half as long as article 3, bearing 2 apical setae as long as article and 1 shorter subapical seta.

Coxae 1–4 progressively larger. Coxa 1, rounded anteriorly, with 4 setules. Coxa 2 subrectangular, moderately expanded distally, with 3 ventral and 2 posterior setules. Coxa 3 subrectangular, expanded distally, with 3 ventral setules, posteroventral corner with 1 setule and 5 medium setae, posterior margin with 4 setules. Coxa 4, anterior margin strongly convex distally, anterior and posterior margins divergent, ventral margin with 3 setules, posteroventral corner bearing 6 medium setae, posterior ventral margin with 3 setules, posterior emargination shallow.

Gnathopods weak, dissimilar. Gnathopod 1 simple, article 2 with long setae on distal half of posterior margin, anterior margin with shorter setae distally; article 3 with weak setal brush posteriorly; article 5 expanded, posterior margin rounded, strongly setose; article 6 short, oval, 63% as long as article 5; dactylus 46% as long as article 6 (Figs. 14, 15). Gnathopod 2 slightly subchelate, article 2 with long setae on posterior margin; article 3 with strong setal brush posteriorly; article 6, 62% as long as article 5, palm almost transverse, excavate medially, distally acutely produced; dactylus short, reaching apex of palm, setose poste-



Figs. 1–4. *Eophoxocephalopsis colombus*. Holotype, ovigerous female. 1, 2, Head, lateral and dorsal views; 3, 4, Antennae 1, 2. Scales: A, Figs. 1, 2; B, Figs. 3, 4.



Figs. 5–17. *Eophoxocephalopsis colombus*. Holotype, ovigerous female. 5, Upper lip; 6, 7, Right and left mandibles; 8, Mandibular palp; 9, Lower lip; 10, Maxilla 1; 11, Outer plate of maxilla 1; 12, Maxilla 2; 13, Maxilliped; 14, Gnathopod 1; 15, Propodus of gnathopod 1; 16, Gnathopod 2; 17, Propodus of gnathopod 2. Scales: A, Figs. 5–10, 12, 13, 15, 17; B, Fig. 11; C, Fig. 14.

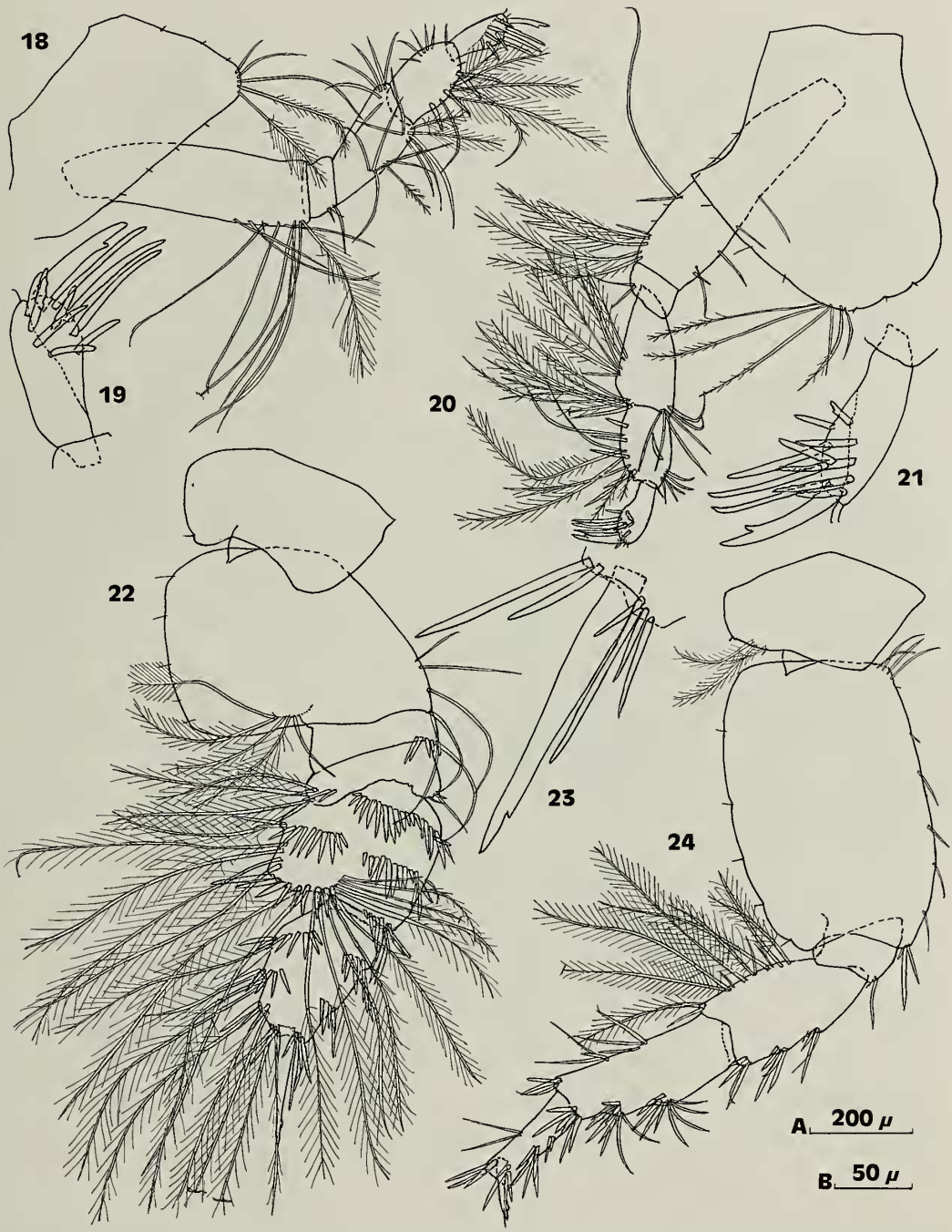
riorly (Figs. 16, 17). Peraeopods 3 and 4, article 2, 4 and 5 strongly setose; article 4 much shorter than article 2; article 5 72% and 77% as long as article 4 respectively of peraeopods 3 and 4, spine formula 3 + 1 and 4 + 1 respectively; article 6, spine formula 5 + 3 + 2 and 4 + 4 + 1 respectively; dactylus longer and stouter than spines on article 6, with strong accessory tooth (Figs. 18–21). Peraeopod 5 (Fig. 22), article 2 with medium-length setae on distal half of anterior margin; articles 4–6 broadly expanded and armed with facial spines; article 6 narrower than article 5, about 116% length of article 5; dactylus (Fig. 23) styliform, elongate, slender, with accessory tooth, lacking nail. Peraeopod 6 (Fig. 24) somewhat longer than latter appendage; article 4 with 8 long plumose setae and short spines posteriorly; dactylus (Fig. 25) longer than surrounding spines, with accessory tooth. Peraeopod 7 (Fig. 26) about as long as peraeopod 5; article 2 subcircular; article 4 with 1 medium plumose seta posteriorly, the reminder articles without plumose setae, although distal articles with more shorter simple setae than corresponding articles of peraeopod 6; dactylus (Fig. 27) longer than surrounding spines, with accessory tooth.

Epimera 1–3 increasing in size posteriorly; epimera 2 and 3 with hooklike tooth at posteroventral angle. Epimeron 1 (Fig. 28), facial armature consisting of many long plumose setae. Epimeron 2 (Fig. 29), posterior margin above angle strongly convex, face with 8 and 2 long plumose setae disposed in 2 rows. Epimeron 3 (Fig. 30), facially with 2 rows of 5 and 2 long plumose setae. Pleopods 1–3 (Figs. 31–34) decreasing in size posteriorly; peduncle of 2 and 3 shorter than that of pleopod 1, each bearing 2 locking spines, with 19 + 13, 15 + 11, 14 + 10 articles on outer and inner rami, basal article of inner ramus with clothespin spine.

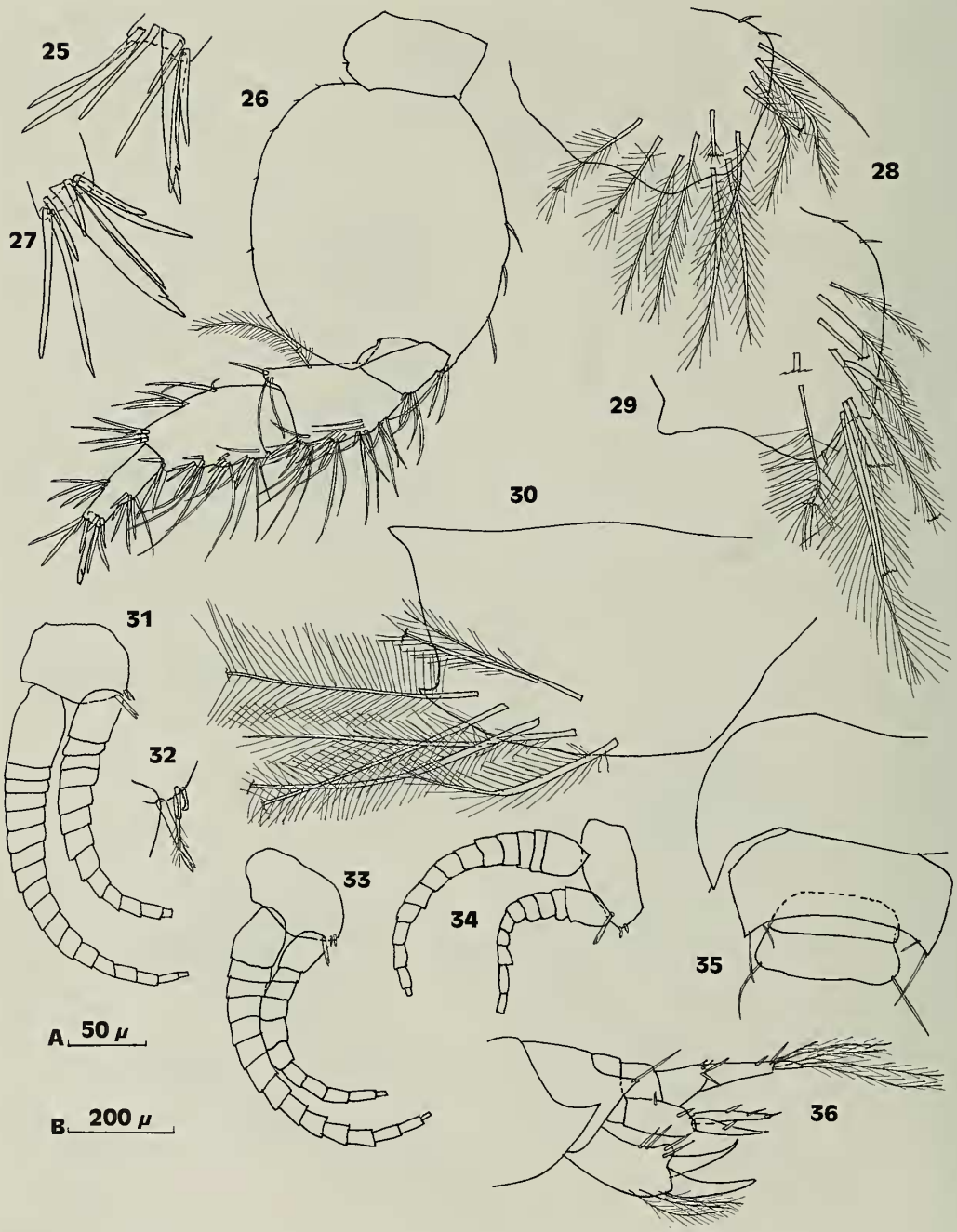
Gills present on coxae 2–6, on coxae 5 and 6 small. Oostegites long, slender, setose, on coxae 2–5.

Urosomite 1, lateral projection slightly longer than urosomite 2, with 1 apical long seta (Figs. 35, 36). Uropod 1 (Fig. 37), peduncle with dorsolateral margin bearing 1 long spine proximally and 1 shorter spine distally, lateral margin with 3 long plumose setae and proximal to these 1 spine, medial margin with 3 spines and 2 setae bearing short plumosity; rami naked, strongly styliform, inner ramus shorter than outer (latter with tip broken). Uropod 1 from opposite side (Fig. 38), peduncle with dorsolateral margin bearing 2 long spines proximally and 1 shorter spine distally, lateral margin with 4 long plumose setae and 1 spine proximally to these, medial margin with 2 spines distally and proximally 2 spines and 4 medium simple setae; rami naked, inner ramus 75% as long as outer, each with an apparent articulating apical nail. Uropod 2 (Fig. 39), peduncle with dorsolateral margin bearing 3 spines, medial margin with 2 spines and 2 long setae; outer ramus styliform with single dorsal spine (tip broken); inner ramus rod-like shorter than outer, with 2 medial and 2 apical spines. Uropod 2 from opposite side (Fig. 40), peduncle with medial margin bearing only 1 seta; outer ramus with only 1 apical spine; inner ramus about 95% as long as outer ramus, with an apparent articulating apical nail. Uropod 3 (Fig. 41), peduncle short, broader than long, 3 spines distolaterally, 2 spines and 7 setae mediolaterally; outer ramus article 1 with 2 groups of 2 spines and 1 long plumose seta laterally, 3 groups of 1 seta each plus 1 spine (except proximal group with only 1 seta) medially, article 2 42% as long as article 1, with 2 plumose setae (one of these broken) and 1 setule at apex; inner ramus with 1 spine and 1 seta laterally, 5 setae medially and 2 apical setae, all long and plumose. Uropod 3 from opposite side (Fig. 42), peduncle with 5 distolateral spines. Telson (Fig. 43) short, broader than long, length 67% of width, cleft 84% of length, apices rounded with 1 spine, each lateral margin with basal pair of spines, 2 plumose setules, 1 spine and single plumose setule.

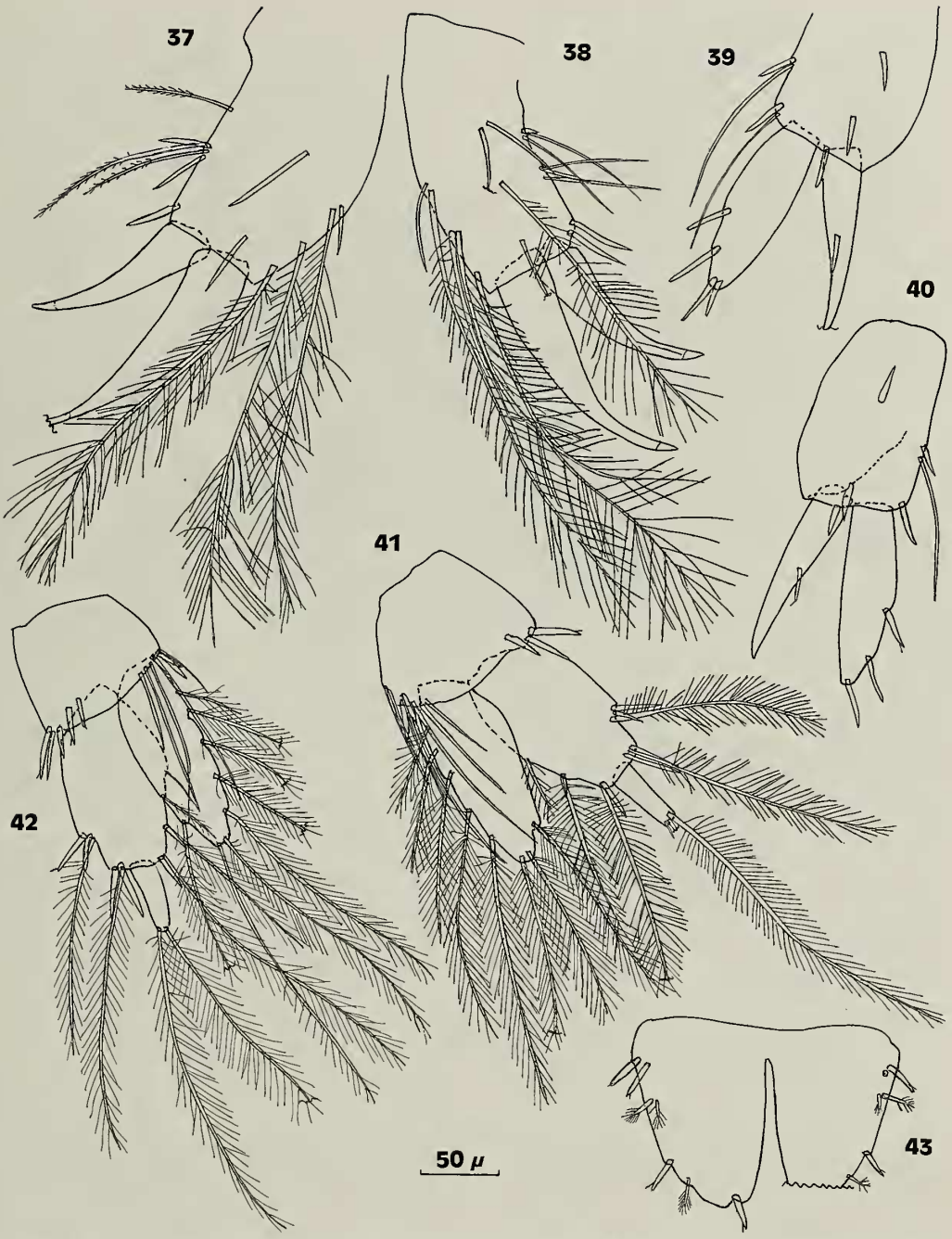
Paratype male from Colombo beach,



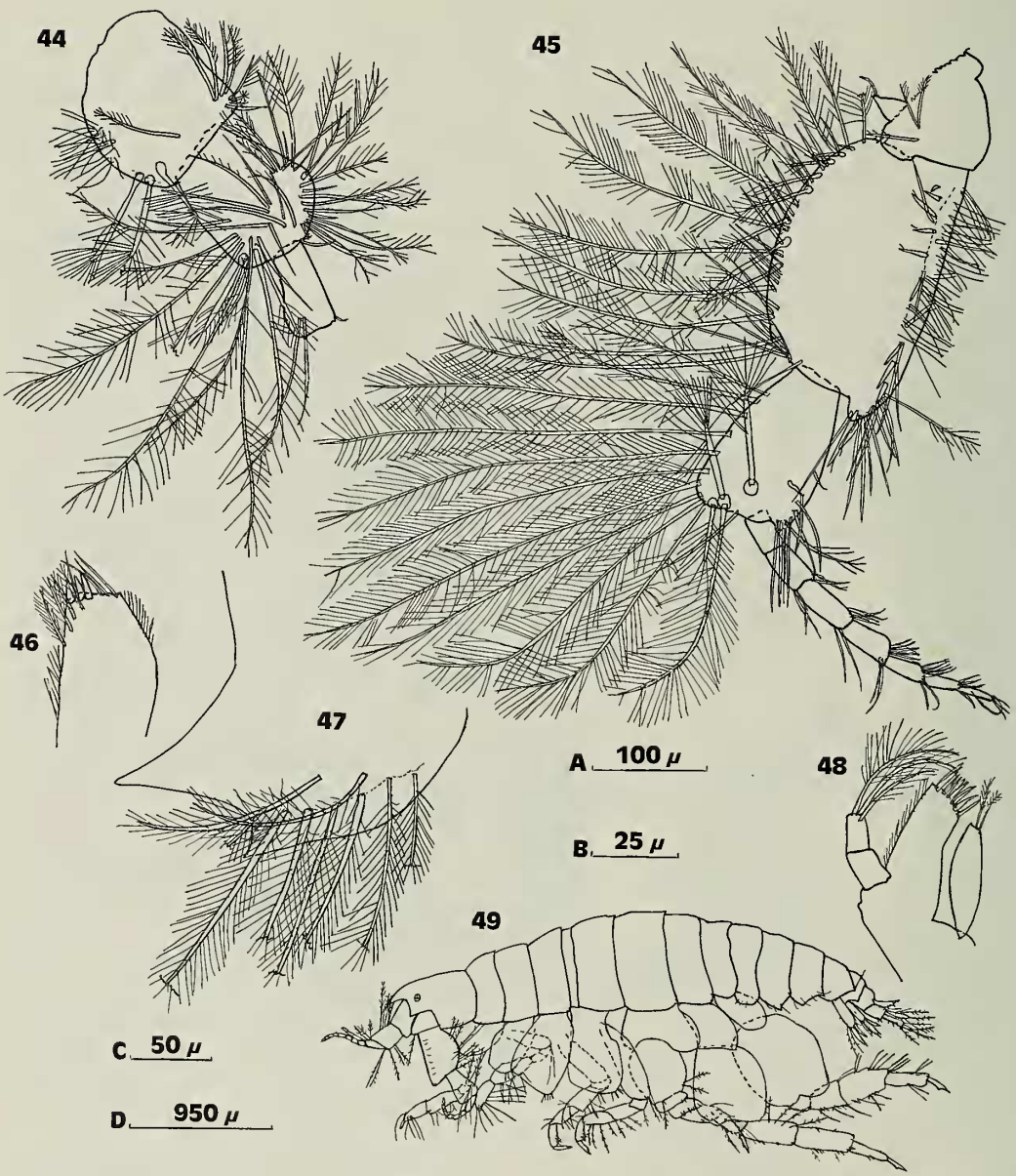
Figs. 18–24. *Eophoxocephalopsis colombus*. Holotype, ovigerous female. 18, Peraeopod 3; 19, Propodus of peraeopod 3; 20, Peraeopod 4; 21, Propodus of peraeopod 4; 22, Peraeopod 5; 23, Dactylus of peraeopod 5; 24, Peraeopod 6. Scales: A, Figs. 18, 20, 22, 24; B, Figs. 19, 21, 23.



Figs. 25–36. *Eophoxocephalopsis colombus*. Holotype, ovigerous female. 25, Dactylus of peraeopod 6; 26, Peraeopod 7; 27, Dactylus of peraeopod 7; 28–30, Epimera 1–3; 31, Pleopod 1; 32, clothespin and locking spines of pleopod 1; 33, 34, Pleopods 2, 3; 35, 36, Urosome, dorsal and lateral views. Scales: A, Figs. 25, 27–30, 32; B, Figs. 26, 31, 33–36.



Figs. 37–43. *Eophoxocephalopsis colombus*. Holotype, ovigerous female. 37, 38, Right and left uropods 1; 39, 40, Right and left uropods 2; 41, 42, Right and left uropods 3; 43, Telson.



Figs. 44–49. *Eophoxocephalopsis colombus*. Paratype male (Colombo beach, depth 2 m). 44, 45, Antennae 1, 2; 46, Inner plate of maxilliped; 47, Epimeron 3. Paratype, ovigerous female (El Rincón). 48, Maxilla 1. Paratype male (El Rincón). 49, Body lateral view. Scales: A, Figs. 44, 45; B, Fig. 46; C, Figs. 47, 48; D, Fig. 49.

depth 2 m, body length 3.0 mm. Similar to holotype, but differs from it as follows. Antenna 1 (Fig. 44), peduncle article 1 with pubescence; primary flagellum with 6 articles, formula of long aesthetascs 3-2-3-3-1; accessory flagellum with 3 articles. Antenna 2 (Fig. 45), peduncle article 4 with pubescence; flagellum with 7 articles, some of these more hairy.

Maxilliped, inner plate with 2 thick apical spines and between these a narrower spine (Fig. 46).

Peraeopods 3 and 4, article 6 spine formula 4 + 2 + 1.

Epimeron 3 (Fig. 47), posteroproximal angle much more produced and acute. Pleopods, rami with fewer articles.

Uropod 3, peduncle with 4 distolateral spines, 3 spines and 4 setae mediolaterally; outer ramus article 1 with 3 groups of 1 spine the most proximal group, and with 2 spines and 1 plumose seta the others; inner ramus with 1 spine and 2 plumose setae laterally, medially with ordinary plumose setae and 1 spine almost distal; plumose setae and spines longer than in female (relative length).

Paratype male, apparently mature, exhibits weak sexual dimorphism, which is particularly denoted on antennae 1 and 2, and uropod 3. Other dissimilarities with regard to holotype are confined to differences in number of spines and setae.

Paratype ovigerous female from El Rincón (Sta 13), body length 3.5 mm. Antenna 1, primary flagellum with 7 articles, formula of long aesthetascs 0-1-1-1-1-1; accessory flagellum with 3 articles. Antenna 2, flagellum with 6 articles.

Maxilla 1 (Fig. 48), inner plate with 2 plumose setae. Maxilliped, inner plate with 2 thick apical spines, and between these another narrower spine.

Peraeopods 3 and 4, article 5, spine formula 3 + 1; article 6, spine formula 4 + 4 + 1.

Uropod 1, peduncle with dorsolateral margin bearing 2 spines proximally and 1 distally, lateral margin more spinose. Uropod 2, peduncle with dorsolateral margin bearing 3 spines distally, medial margin with 2 spines plus 2 plumose setae and 1 spine plus 1 plumose seta; inner ramus with 2 medial spines and 1 apical spine. Uropod 3, peduncle with 5 distolateral spines, mediolaterally with 4 spines and 4 simple setae; outer ramus article 1 with 3 groups of 1 spine the most proximal group and the other groups with 2 spines and 1 plumose seta laterally, medially with 3 plumose setae (without accompanying spine), article 2 with 2 long plumose setae and short setule at apex; inner ramus with 2 plumose setae laterally, 4 plumose setae and 2 distal spines in 2 groups medially. Telson, one apex with 2 spines, the other with 1.

Paratype male from El Rincón (Sta 13), body length 3.25 mm (Fig. 49). Antennae 1 and 2 with pubescence as in paratype from Colombo beach, depth 2 m.

Maxilla 1, inner plate with 1 plumose seta. Maxilliped, inner plate with 2 thick apical spines.

Peraeopods 3 and 4, article 5, spine formula 3 + 1; article 6, spine formula 4 + 3 + 1.

Uropods 1 and 2 as usual, but with variations in number of spines and setae on peduncle. Uropod 2, inner ramus with 2 apical spines, besides common pair of medial spines.

Variations.—Some variations, especially in number of spines and setae were observed in the different populations from both sampling localities: Colombo beach and El Rincón. This morphological diversity was found also in a same population, among specimens, and in the same individuals, which frequently showed this kind of dissimilarity.

Etymology.—The specific name, a noun in apposition, refers to Colombo beach, the holotype female and paratype male locality.

Relationships.—The new species reported here was assigned to *Eophoxocephalopsis* Thurston, 1989 because it generally agrees with the diagnosis of the genus. The minor morphological differences observed between the taxa do not justify the erection of a new genus, and these can be summerized as follows. The present species has the upper lip incised, versus upper lip anteriorly rounded; the maxilla 1 inner plate is elongate, thin, scarcely setose, and the outer plate bears eleven spines, versus inner plate broad, trapezoidal, setose, and outer plate with eight spines. In addition, the new species can be separated from species of *Phoxocephalopsis* Schellenberg, 1931 and *Puelche* Barnard & Clark, 1982, by the poorly

toothed incisor process, which in both genera is untoothed, the gnathopod 2 with its characteristic palm rather than the subchelate condition, the styliform outer ramus of uropod 2 instead of the rodlike outer ramus. Species of *Phoxocephalopsis* exhibit a strong spinous facial armature on antenna 2 article 5 and an enlarged epimeron 2. Species of *Puelche* lack the typical oblique facial row of setae on inner plate of maxilla 2 described for *Eophoxocephalopsis*.

Eophoxocephalopsis colombus is distinguished from *E. rhachianensis* Thurston, 1989 in that the maxilla 1 inner plate has one seta, or occasionally two, and its outer plate has eleven spines; the upper lip is incised anteriorly; the gnathopod 1 merus is much shorter in relation to the length of this article on gnathopod 2; the gnathopod 2 palm and dactylus are somewhat different; the coxa 4 anterior and posterior margins are strongly divergent; the epimera are different in shape, especially the epimeron 3; the epimeron 3 is larger (relative to epimeron 2); the uropod 1 has fewer dorsolateral spines, and its inner ramus is longer. It can be separated from the other known species of the genus, *E. deceptionis* (Stephensen, 1947), which lacks eyes, has epimera 2 and 3 subequal and the uropod 2 outer ramus bears two dorsal spines.

Acknowledgments

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Literature Cited

Barnard, J. L., & J. Clark. 1982. *Puelche orensanzi*, new genus, new species, a phoxocephalopsid amphipod from the shores of Argentina (Crustacea, Amphipoda, Phoxocephalopsidae).—Journal of Crustacean Biology 2:261–272.

Schellengberg, A. 1931. Gammariden und Caprelliden des Magellangebietes, Südgeorgiens und der Westantarktis.—Further Zoological Results of the Swedish Antarctic Expedition 1901–1903 2(6):1–290.

Stephensen, K. 1947. Tanaidacea, Isopoda, Amphipoda and Pycnogonida.—Scientific Results of the Norwegian Antarctic Expedition 1927–1928 27:1–90.

Thurston, M. H. 1989. A new genus and species of fossorial amphipod from the Falkland Islands (Crustacea, Amphipoda, Phoxocephalopsidae), with notes on *Phoxocephalopsis*.—Journal of Natural History 23:299–310.